

4.1 Exchange with the Environment

I. Diffusion

- A. Particles tend to travel from where they are crowded to where they are less crowded
- B. Diffusion of water
 1. The diffusion of water through cell membranes is important to life processes, known as osmosis
 - a. H_2O is made of molecules
 - b. When H_2O is mixed with something, it makes the H_2O concentration less
 2. Semipermeable membranes only allows certain substances to pass through
- C. The Cell and Osmosis
 1. Osmosis is critical for cell functions

Nov 6-1:15 PM

- a. Red blood cells are surrounded by plasma
- b. Plasma is made of H_2O , salts, sugars, etc.
- c. Osmosis keeps plasma surrounding red blood cells in balance

II Moving Small Particles

- A. Small particles, such as sugars, can cross the cell membrane through channels
 1. Channels are made of proteins
 2. Particles travel through channels by passive or active transport
- B. Movement of particles across the cell membrane w/out the use of energy = passive transport
 1. Diffusion + Osmosis are passive transport
- C. Process of moving across cell membrane against concentration gradient is active transport
 1. Uses energy

Nov 6-1:53 PM

2. Particles go from low to high concentration

III Moving Large Particles

- A. Large particles are moved by endocytosis + exocytosis (both active transport)
- B. Endocytosis - cell membrane wraps around the particle until a vesicle forms around the particle and the particle is completely inside of cell
- C. Exocytosis - vesicle around particle moves to cell membrane, joining w/ cell membrane releasing particle outside of cell

Nov 6-2:03 PM

4.2 Cell Energy

I. From Sun to Cell

- A. Nearly all energy that fuels life comes from sun via photosynthesis
 - 1. Plant sunlight (energy) and turn it into food

II Photosynthesis

- A. Plant cells have pigments
 - 1. Chlorophyll is the pigment in plants that gives them their green color
 - a. Chlorophyll is found in chloroplasts
- B. Photosynthesis

$$6\text{CO}_2 + \text{H}_2\text{O} + \text{Energy} \xrightarrow{\text{(sun)}} \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$$

glucose

Nov 7-1:31 PM

III Getting Energy from food

A. Animal cells have different ways of getting energy from food

1. Cellular respiration uses oxygen to break down food into energy
2. Most of cellular respiration takes place in the cell membrane of prokaryotes
3. Cellular respiration takes place in the mitochondrion for eukaryotes
4. Cellular Respiration Equation



Nov 7-1:40 PM

B. Connection between Photosynthesis and cell respiration

1. Photosynthesis uses CO_2 to make glucose + O_2
2. Cell respiration uses glucose to make energy + CO_2

C. Fermentation

1. Unlike cellular respiration, fermentation does not require oxygen to produce energy
2. When your muscles don't get enough oxygen, they make lactic acid from the process of fermentation

Nov 7-1:49 PM

4.3 Cell Cycle

I The life of a cell (cell cycle)

- A. Cell cycle begins when the cell is formed and ends when the cell divides and forms new cells
 - 1. DNA must be copied before a cell can divide
 - 2. DNA in cell is organized in structures called chromosomes
 - 3. Copying chromosomes ensures that each new cell is a copy of the parent cell

II Making more Prokaryotic Cells

- A. Cell division in bacteria is called binary fission, which means splitting into two parts

III Eukaryotic cells and their DNA

Nov 9-12:29 PM

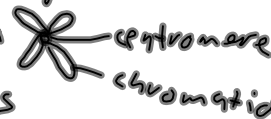
- A. Eukaryotes are more complex than prokaryotes
 - 1. The complexity of the organism determines how many chromosomes are present (DNA)
 - a. Humans have 46 chromosomes (23 pairs)

IV Making more Eukaryotic Cells

- A. Mitosis is the process in eukaryotes where cells divide into 2 cells with the same genetic material and same amount of chromosome

B. Three steps to cell division

- 1. Interphase - cell grows + copies chromosomes + organelles
 - a. Each copied chromosome is known as a chromatid
 - b. chromatids are held together in the center by the centromere
- 2. Second stage = Mitosis
- 3. Cell splits into two cells (cytokinesis)



Nov 9-12:37 PM

- V Mitosis and Cell Cycle
- A. Interphase (DNA copied)
 - B. Prophase
 - 1. mitosis begins, nuclear membrane dissolves, chromosomes condense
 - C. Metaphase
 - 1. chromosomes line up along equator of cell, homologous chromosomes pair up
 - D. Anaphase
 - 1. chromatids separate + move to opposite ends of cell
 - E. Telophase
 - 1. Nuclear membrane forms around each new set of chromosomes, chromosomes unwind, Mitosis is finished
 - F. Cytokinesis
 - a. cells separate into two separate cells
 - b. plant cells separate via a cell plate

Nov 9-12:49 PM

Cell Cycle Review

Grade: 7th
Subject: Life Science
Date:

Nov 12-12:25 PM

1 Cellular respiration is the process by which ...?

- A plant cells create glucose
- B cells grow and reproduce
- ☒ C cells use oxygen to produce energy from food

Nov 12-12:36 PM

2 Fermentation in muscle cells produces...?

- A glucose
- B acetic acid
- ☒ C lactic acid

Nov 12-12:36 PM

3 The movement of water through a membrane is known as ...

osmosis

Nov 12-12:37 PM

4 The process by which a cell gets rid of large particles...is?

exocytosis

Nov 12-12:41 PM

5 the process of cell division that forms two nuclei

mitosis

Nov 12-12:44 PM

6 The life stages of a cell is known as?

cell cycle

Nov 12-12:45 PM

7 Pairs of similar chromosomes are called heterogeneous chromosomes

True

False

(homologous)

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8 The division of cytoplasm is known as (also, the last step of cell division after mitosis)

cytokinesis

Nov 12-12:46 PM

9 Cells need to reproduce new cells in order to ...?

- A release energy from food
- B create new chromosomes
- ☒ C replace cells that have died

Nov 12-12:47 PM

10 Organelles and chromosomes are copied during ...?

- ☒ A the first stage of eukaryotic cell division
- B cytokinesis
- C the second stage of eukaryotic cell division

Nov 12-12:49 PM

11 During cytokinesis in plant cells

- A a cell plate forms inside two new cells
- ☒ B a cell plate forms, and the cell splits into two
- C the cell wall breaks

Nov 12-12:51 PM

12 Eukaryotic cells....

- A undergo binary fission
- ☒ B undergo mitosis
- C have cell walls

Nov 12-12:52 PM

13 The correct order for mitosis is...

- ☒ A Interphase, prophase, metaphase, anaphase, telophase, and cytokinesis
- ☐ B Interphase, telophase, anaphase, prophase, metaphase, and cytokinesis
- ☐ C Cytokinesis, prophase, metaphase, telophase, anaphase, and interphase

Nov 12-12:54 PM

Bellringer

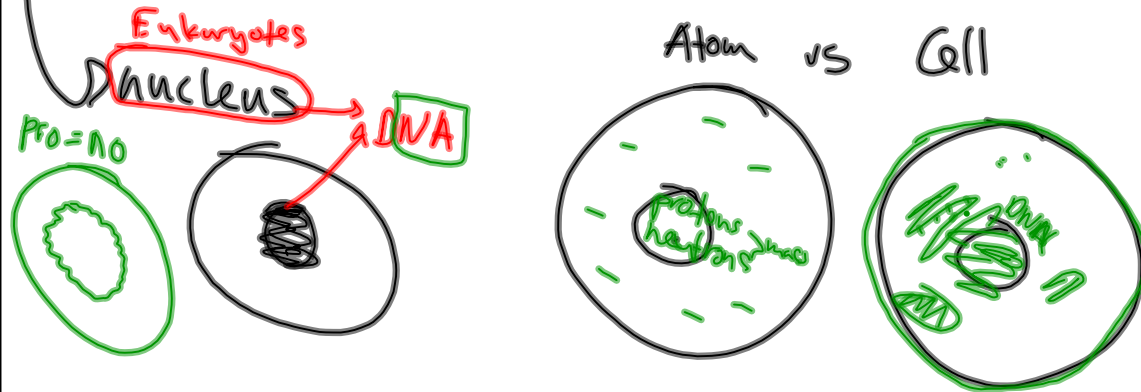
- What are the stages of mitosis? in order ...
Interphase PMAT Pro, Meta, Ana, Telo
- What is ~~photosynthesis~~? How does it work? $6\text{H}_2\text{O}$
 $\text{CO}_2 + \text{H}_2\text{O} \xrightarrow{\text{light energy}} \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$
- What is cellular respiration? How does it work?
 $\text{O}_2 + \text{C}_6\text{H}_{12}\text{O}_6 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{ATP}$

Binary Fission
Bacteria

Oct 21-10:20 AM

Bellringer

- What is a cell? the basic unit of living things
 cell → tissues → organ → organ system → organism
- What are the different types of cells?
 plant cells + animal cells (eukaryotes)
- How do cells make energy?
- How do cells make more cells?



Oct 21-2:07 PM